CLAIMS

1. A method for producing a metal casting, comprising:

providing a metal in a crucible;

melting the metal in the crucible under an inert atmosphere using an arc from an electrode;

agitating the molten metal in the crucible by supplying a high frequency alternating current to the electrode;

superimposing a direct current to alter the balance of the alternating current; and

releasing the molten metal into a mould.

2. A method according to claim 1, in which the metal provided in the crucible comprises at least two parts of different compositions.

3. A method according to claim 1 or 2, further comprising stirring the molten metal in the crucible.

4. A method according to claim 3, in which the molten metal is stirred by establishing relative movement between the arc and molten metal in the crucible.

5. A method according to claim 4, in which the relative movement is established by oscillating the electrode.

6. A method according to any one of the preceding claims, in which the alternating current is of varying frequency.

7. A method according to any one of the preceding claims, wherein the DC supply can be switched between positive and negative.

8. A method according to any one of the preceding

claims, in which a positive direct current is superimposed for cleaning the molten metal.

9. A method according to any one of the preceding claims, further comprising varying the pressure of the inert atmosphere during melting.

10. A method according to any one of the preceding claims, further comprising heating the mould prior to pouring the molten metal.

11. A method according to any one of the preceding claims, further comprising introducing a pressure differential between the crucible and the mould to encourage molten metal flow from the crucible to the mould when pouring commences.

12. An item of jewellery cast by a method in accordance with any one of claims 1 to 11.

13. Apparatus for producing a metal casting, comprising a crucible, means for establishing an inert atmosphere around metal in the crucible, an electrode, means for supplying a high frequency alternating current to the electrode to generate an arc for melting metal in the crucible, and means for superimposing a direct current to alter the balance of the alternating current, and a mould for receiving molten metal from the crucible.

14. Apparatus according to claim 13, comprising means for switching the DC between positive and negative.

15. Apparatus according to claim 13 or 14, in which the stirring means comprises drive means for oscillating the position of the electrode.

16. A method according to any one of claims 13 to 15, in which the alternating current is of varying frequency.

17. Apparatus according to any one of claims 13 to 16, further comprising means for varying the pressure of the inert atmosphere established.

18. Apparatus according to any one of claims 13 to 17, further comprising a conduit communicating between the crucible and the mould, and having a valve for regulating molten metal flow through the conduit.

19. Apparatus according to claim 18, further comprising means for establishing a pressure differential across the valve for urging molten metal flow through the conduit when the valve is open.

20. Apparatus according to claim 19, in which the pressure differential establishing means comprises suction means for reducing gas pressure in the mould.

21. Apparatus according to any one of claims 13 to 20, in which the electrode is a tungsten electrode.

22. Apparatus according to claim 21, in which the tungsten electrode is part of a tungsten arc torch.

23. Apparatus according to any one of claims 13 to 22, further comprising means for varying the separation between the electrode and the crucible.

24. Apparatus according to any one of claims 13 to 23, in which the crucible is of graphite.

25. Apparatus according to any one of claims 13 to 24, in which the mould is of graphite.

26. Jewellery casting apparatus comprising apparatus

according to any one of claims 13 to 25.

27. A method of producing a metal casting substantially as hereinbefore described with reference to, and as illustrated in, the accompanying figures.

28. Apparatus for producing a metal casting substantially as hereinbefore described with reference to, and as illustrated in, the accompanying drawings.

29. A method for producing a metal casting, comprising:

providing a metal in a crucible;

melting the metal in the crucible under an inert atmosphere using an arc from an electrode of a tungsten arc torch, stirring the molten metal by oscillating the electrode of the torch; and

releasing the molten metal into a mould.

30. Apparatus for producing a metal casting, comprising a crucible, means for establishing an inert atmosphere around metal in the crucible, a tungsten arc torch having an electrode, means for supplying electricity to the electrode to generate an arc for melting metal in the crucible, drive means for oscillating the position of the electrode to stir molten metal in the crucible, and a mould for receiving molten metal from the crucible.